

Effect of genetic group and age of bucks on some blood physical and biochemical traits

تأثير المجموعة الوراثية والعمر في بعض صفات الدم الفيزيائية والكيميائية الحيوية لذكور الماعز

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الخلاصة //

أجريت هذه الدراسة في محطة تحسين الماعز في عركوف والتابعة لمركز إباء للأبحاث الزراعية لدراسة تأثير المجموعة الوراثية والعمر على بعض الصفات الدموية والكيميائية لذكور الماعز وللمدة من آذار ولغاية حزيران من عام 2002 . استخدم في هذه الدراسة 43 ذكر ماعز والتي شملت على 16 ذكر محلي و 11 ذكراً (مضرب الشامي X المحلي) و 16 ذكراً مضرب (السانين X المحلي) وبأعمار تراوحت بين 8-17 شهراً، فقد وزعت حسب العمر إلى فئتين عمرية هي 8-11 و 12-17 شهراً. جمعت عينات الدم من الذكور لمرة واحدة لدراسة الصفات الدموية والتي شملت تركيز الهيموكلوبين وحجم خلايا الدم المضغوطة ومعدل ترسيب الكريات الدموية وكذلك تركيز البروتين الكلي، أما الصفات الكيميائية للدم المدروسة فقد شملت تركيز أنزيم الفوسفاتيز القاعدي والأنزيمات الناقلة لمجموعة الأمين. كما تم إيجاد معامل الارتباط بين مجمل صفات الدم المدروسة.

بينت نتائج الدراسة انه لم يتضح وجود تأثير معنوي للمجموعة الوراثية على تركيز الهيموكلوبين وحجم خلايا الدم المضغوطة ومعدل ترسيب الكريات الدموية وتركيز البروتين الكلي في مصل الدم، وقد بلغ المعدل العام لها 8.51 ± 0.97 غم/100 مل ، 27.00 ± 0.47 % ، 9.73 ± 0.69 ملم westergreen pipette /24 ساعة و 10.56 ± 0.97 غم/100 مل على التوالي. تميزت الذكور الكبيرة العمر بارتفاع تركيز الهيموكلوبين وانخفاض معدل ترسيب الكريات الدموية، فقد بلغ تركيز الهيموكلوبين 7.41 ± 0.29 و 9.31 ± 0.33 غم/100 مل ومعدل ترسيب الكريات الدموية 11.82 ± 1.03 و 8.25 ± 0.8 ملم westergreen pipette /24 ساعة للذكور التي تراوحت أعمارها بين 8-11 و 12-17 شهراً على التوالي. كما لم يتضح وجود تأثير معنوي للمجموعة الوراثية على جميع صفات الدم الكيميائية المدروسة، فقد بلغ المعدل العام لتركيز أنزيم الفوسفاتيز القاعدي وأنزيم الاوكساليت والبايروفيت الناقلة لمجموعة الأمين 2.99 ± 39.44 KAU/dl ، 56.51 ± 2.15 U/L و 45.12 ± 5.48 U/L على التوالي. بينما تميزت الذكور الصغيرة العمر بارتفاع تركيز أنزيم الفوسفاتيز القاعدي في مصل فقد بلغ 49.18 ± 2.23 و 29.70 ± 4.49 KAU/dl للذكور الصغيرة والكبيرة العمر على التوالي.

Abstract

This study was conducted at Agragof goat improvement station, IPA Agriculture Research Center to study the effect of genetic group and age of bucks on some physical and biochemical of blood for a period from March to June 2002. Forty three bucks from a different genetic groups, which including 16 local, 11 crossbred(Local X Shami) and 16 crossbred (Sannan X Local), also males were dividing to age, young bucks(8-12 month) and an older one (12-17 month) to study the effect of age on some blood parameters studied. Blood samples were collected once from each buck to determining the hemoglobin concentration(Hb), packed cell volume(PCV), erythrocyte sedimentation rate(ESR), total serum protein, Alkaline phosphatase enzyme concentration(ALK) and glutamic oxaloacetic transamiase (GOT) and glutamic pyruvic transaminase(GPT) enzymes concentration.

Data indicated that, genetic group had a significant effect ($P<0.05$) on hemoglobin concentration, packed cell volume, erythrocyte sedimentation rate and total serum protein concentration ,which mean were 8.51 ± 0.97 gm/dl , 27.00 ± 0.47 % , 9.73 ± 0.61 mm wintergreen pippette/24 hrs. And 10.56 ± 0.97 gm/dl respectively. Older bucks (12-17 month) showed a significant increased ($P<0.05$) in the concentration of hemoglobin (7.41 ± 0.49 and 9.31 ± 0.33 gm/dl) and decreased in the erythrocyte sedimentation rate (11.82 ± 1.03 and 8.25 ± 0.8 mm wintergreen pippete/24 hrs) for bucks aged 8-12 and 12-17 month respectively. Also

data revealed that genetic group had no significant effect on all biochemical blood parameters studied and the over all mean of alkaline concentration, glutamic oxaloacetic and pyruvic transaminase were 39.44 ± 2.99 KAU/dl, 56.51 ± 2.51 U/L and 45.12 ± 5.48 U/L respectively. While young bucks showed an increased ($p < 0.05$) in the alkaline phosphatase concentration in comparable to older bucks which being 49.48 ± 2.23 and 27.70 ± 4.49 KAU/dl respectively.

Introduction

In the recent years, researchers were indeed work hardly to improve the breeding of small ruminants especially the goats because of the important role of this animal. Local goat in Iraq have been wide spread in many countries, and the meat and milk production of this animal have being low also less efficiency in reproduction. So that there was attempted from many research centers to improve it by the cross breeding with Shami and Sannan goats, which known as a good genetic group in reproduction and production in the other hand Shami goats consider a desirable breed form farmer in Iraq.

Blood plays a decisive role in the regulation of life processes, a blood status within normal range shows that there is at least no pathological condition, when any change in management and environment or genetic it will be reflected on blood biochemical, such as protein, cholesterol, enzymes activity and other blood parameters. Also, most researchers have been attempt to use some physiological blood parameters as an indicator of genetic marker for production (1), so that this study was conducted to determine the change in the some blood physical and biochemical parameters among the three genetic groups (Local X Shami and Local X sannan).

Materials and Methods

This study was conducted at Agrabof goats improvement station, IPA Agriculture Research Center to study the effect of genetic groups and age on some physical and biochemical blood properties of bucks. Forty three bucks from a different genetic group (16 local , 11 local X Shami and 16 local X Sannan) were classified into two age groups(8-11 and 12-17 months). Two blood samples were obtained once from each buck by the jugular vein using a vacuotainer tube first sample containing EDTA(Ethylene diamine tetra acetic acid) to prevented the blood from clotting and it used to measured the hemoglobin concentration, packed cell volume and erythrocyte sedimentation rate, while the other once blood samples was left to clot and kept in refrigerator (4°C) for about 3 hours and then the serum was obtained by spinning the sample(3000 rpm/min for 10 min) and kept in chest freezer (-20°C) until measuring the total serum protein, alkaline phosphatase , glutamic oxaloacetic and pyruvic transaminase enzymes. Hemoglobin concentration was measured according to cyanomethaemoglobin method of Van Campen and Tijlstra (1), while ESR was determined by using the wintergreen pipette after diluting the blood for about 1/4 with the normal saline (0.9% NaCl) and left in the pipette for 24 hrs., the percentage of the packed cell volume was calculated using heamotocrit tube and spinning at 15000 rpm/min for 7.5 min in a haemofuge (Hereus, Christ, Germany) according to Schalm (3). Total serum protein value was obtained by using Biuret method (4) .Alkaline phosphatase activity were measured according to King and Armstrong (5) while the method of Reitmann and Frankle (6) was used to calculated the concentration of glutamic oxaloacetic and pyruvic transaminase enzymes.

The effect genetic groups and age of bucks on the some blood traits mentioned and results were analyzed using the General Linear Model(GLM) procedure within the SAS program(7).

Results and Discussion

Results indicated that genetic group of bucks had no significant effect ($P > 0.05$) on blood physical traits studied (table 1), and the over all means were 8.51 ± 0.027 gm/dl, 27.00 ± 0.47 % and 9.73 ± 0.69 gm/dl mm westergren pippete/24 hrs. for Hb , PCV and ESR respectively. Working on lambs (8) reported a similar means of the Hb (8.19 ± 0.71 gm/dl), ESR(9.9 ± 0.3 mm westergren pippete/24 hrs.) and PCV (25.12 ± 1.53 %). It seems that the cross breeding in goat between local breed and an other one (shami or Sannan) had no alter the profile of the physical blood parameters studied or it is may be in the same environmental and management factors such as feeding practice of the three genetic groups in the trials. As it can be seen from table(1) bucks aged 12-17 month were shown a significant increase ($P < 0.05$) in the Hb conc. (9.31 ± 0.33 gm/dl) and a significant decreased ($P < 0.05$) in the ESR (8.25 ± 0.80 mm westergren pippete/24 hrs.) than those aged 8-12 month which were 7.41 ± 0.29 gm/dl and 11.82 ± 1.93 mm westergren pippete/24 hrs. for Hb conc. And ESR respectively while the PCV. was similar for both groups. In study, bucks in both groups were in growing, so the Hb conc. Should be increased with the increase of age to provided body with the needing of oxygen and it seems that those bucks in a good health because the ESR was less in a large age group than those in smaller age group (table1) (9 and 10).

The concentration of the alkaline phosphatase in the serum for young bucks was highly significant increased ($P, 0.05$) than those in larger one, which were 49.18 ± 2.23 and 29.70 ± 4.48 KAU/dl for both ages groups respectively. Alkaline phosphatase enzyme has been an important role in the bone formation especially in kids(11 and 12),so that those smaller kids may be in a growing faster than a large males and for this reason the concentration of ALK have been razed(13).

Other parameters studied like Packed cell volume, total serum protein and glutamic oxaloacetic and pyruvic transaminase enzymes were not different significantly between the young and old one bucks(table1).About the PCV, Al-kahazargi 1999(14) reported lower percentages of PCV (22.07%)for local goats than reported by our study (27.00%),which it is less than the mean reported by Schalm 1967(3) (35%).

Table(2) summarized the simple correlations coefficient between some blood parameters studied. Haemoglobin concentration was highly negative correlated ($p < 0.01$) with the ESR (-0.56) and ALK (-0.51) and it is positive correlated with the PCV (0.38). Erythrocyte sedimentation rate was a good parameters to investigated the health of animals especially for those severe from arthritis(4) and it is seems that animals have a high degree of ESR the concentration of haemoglobin will be less, also in the same way the ALK concentration was highly correlated ($p < 0.01$) with the ESR (table2), both values(ESR and ALK) have been increased together. The increase of ESR value indicating probably a decreased in the red blood cell in the circulating system by lyses it in the blood and this make body in critical concentration, so that the ALK phosphatase enzyme increased to acceralated the production of red blood cell from the bone marrow (15).

Table 1. Effect of breed and age on some blood characters of goats.

The effective factors	No	Hb (gm./dl)	PCV (%)	ESR (Westergreen/2 4hrs.)	TP (gm./dl)	ALK (KAU/dl)	GOT (U/L)	GPT (U/L)
Overall mean	43	8.51 ± 0.27	27.00 ± 0.47	9.73 ± 0.69	10.56 ± 0.27	39.44 ± 2.99	56.51 ± 2.15	45.12 ± 5.48
Genetic group								
Local (L)	16	8.45 ± 0.44 a	26.69 ± 0.63 a	10.06 ± 1.19 a	10.56 ± 0.52 a	35.44 ± 6.07 a	56.67 ± 3.38 a	42.46 ± 8.78 a
L x Shami	11	8.49 ± 0.53 a	27.70 ± 1.02 a	9.20 ± 1.22 a	10.72 ± 0.60 a	41.47 ± 5.45 a	58.52 ± 4.82 a	56.96 ± 12.1 a
L x Saanen	16	8.59 ± 0.46 a	26.87 ± 0.90 a	9.73 ± 1.19 a	10.48 ± 0.40 a	40.84 ± 4.59 a	55.24 ± 3.55 a	41.54 ± 8.68 a
Age group (month)								
8-11	18	7.41 ± 0.29 b	26.53 ± 0.66 a	11.82 ± 1.03 a	10.39 ± 0.37 a	49.18 ± 2.23 a	55.48 ± 3.71 a	53.28 ± 9.70 a
12-17	25	9.31 ± 0.33 a	27.33 ± 0.66 a	8.25 ± 0.80 b	10.77 ± 0.41 a	29.70 ± 4.49 b	57.49 ± 2.40 a	38.31 ± 5.75 a

Different small letters within the same column significant difference between means (p<0.05).

Table 2. Simple Correlation coefficient between some blood characters of goats .

	Hb	PCV	ESR	TP	ALK	GOT	GPT
Hb	1	0.38 *	-0.56 **	0.11	-0.51 **	-0.16	-0.20
PCV		1	-0.37 *	-0.03	-0.12	-0.15	0.05
ESR			1	-0.05	0.52 **	-0.40 *	-0.03
TP				1	-0.17	-0.21	-0.06
ALK					1	-0.15	-0.02
GOT						1	0.34
GPT							1

* p<0.05

** p<0.01

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